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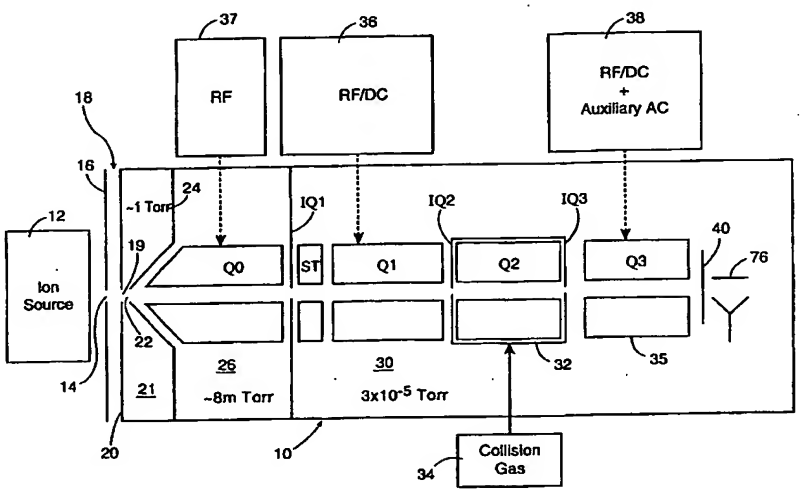
(54) Title: FRAGMENTATION OF IONS BY RESONANT EXCITATION IN A HIGH ORDER MULTIPOLE FIELD, LOW PRESSURE ION TRAP



(57) Abstract: In the field of mass spectrometry, a method and apparatus for fragmenting ions with a relatively high degree of resolution and efficiency. The technique includes trapping the ions in a linear ion trap, in which the background or neutral gas pressure is preferably on the order of 10-5 Torr. The trapped ions are resonantly excited for a relatively extended period of time, e.g., exceeding 50 ms, at relatively low excitation levels, e.g., less than 1 Volt (0-pk). The technique allows selective dissociation of ions with a high discrimination. High fragmentation efficiency may be achieved by superimposing a higher order multipole field onto the quadrupolar RF field used to trap the ions. The multipole field, preferably an octopole field, dampens the radial oscillatory motion of resonantly excited ions at the periphery of the trap. This reduces the probability that ions will eject radially from the trap thus increasing the probability of collision induced dissociation.

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